

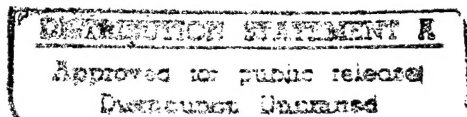
NAVAL WAR COLLEGE  
Newport, R.I.

## OPERATIONAL PROTECTION from the DIESEL SUBMARINE THREAT

by

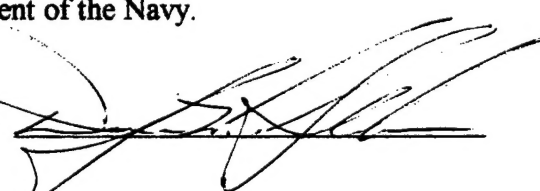
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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## **ABSTRACT OF**

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Most experts agree that the United States' future conflicts will be of a regional vice global scale and will focus on a littoral region. This environment provides unique challenges, particularly as our military shrinks in size. Gone are the days of massive amounts of equipment to counter a threat. Countries throughout the world possess smaller military forces and choose carefully their strategies and equipment to challenge a potential opponent. A weapon of choice today is the diesel-electric submarine. In the littoral region its stealth, size and fire power, particularly against critical vulnerabilities such as sealift, can be devastating to any adversary.

For many years the U.S. concentrated on defeating the open ocean Soviet nuclear powered submarine. Operational protection in the littoral environment against a diesel submarine is significantly different from open ocean protection and one we may not be prepared for today. While our new doctrine recognizes the diesel submarine threat of the littoral, our strategies to protect against it have not changed from the past. In future conflicts, to assure success ashore, we must protect forces afloat from the diesel submarine threat.

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## INTRODUCTION

For more than forty years the United States oriented its military strategy around countering the Soviet threat. Force structure, strategy and doctrine centered on a global conflict of the world's two superpowers. The demise of the Soviet Union marked the end of the Cold War and brought dramatic changes in the U.S. military. Though the likelihood of a global conflict with the former Soviet Union has diminished, the concern over regional conflict has increased. Today the United States faces not one superpower but many potential regional threats.<sup>1</sup> While these threats do not possess the military might of the former Soviet Union, they may not need to, even when facing a numerically and technologically superior force such as the United States or its Allies.

The end of the Cold War, along with growing concerns over an increasing national deficit, has meant monetary cutbacks throughout the government and military. As the commitments of the Navy continue unabated we are learning to do more with less as forces dwindle in size. ...*From the Sea* and *Forward...From the Sea* emphasize the importance of naval forces to defend, strike and operate from the littoral environment, shifting strategy from global to regional and, more specifically, the littoral.<sup>2</sup> A key to battlespace dominance is operational protection of our forces and a significant threat to these forces is the diesel submarine. For the operational commander, battlespace dominance below the surface is as important as in the air and on the surface and requires operational protection from the submarine threat in the littoral environment. This paper will examine the threat the diesel

electric submarine (SSK) poses in the littoral environment and the operational protection required to counter this threat.

## **HISTORICAL BACKGROUND**

How can a small navy challenge a naval power such as the United States? A look at history can provide examples.

U-BOATS AND THE BATTLE OF THE ATLANTIC: The German U-boat campaign in the Battle of the Atlantic was effective because it focused on Allied lines of communication. This in turn slowed and denied the delivery of combat power to Europe.<sup>3</sup>

In 1939, the *Kriegsmarine* presented the Z Plan calling for the build up of the German Navy to challenge the British fleet. War broke out as this plan was just getting underway and the *Kriegsmarine* found itself in the position of having to face a British fleet that outnumbered them seven to one in battleships, six to one in cruisers and nine to one in destroyers with plans for only two aircraft carriers against Britain's six.<sup>4</sup>

Admiral Karl Doenitz, Officer Commanding U-boats, had proposed 300 U-boats to defeat Britain's navy, but had only 57 at the start of hostilities.<sup>5</sup> Despite these inferior numbers, U-boat attacks on British shipping nearly won Germany control of the Atlantic. So devastating was U-boat action that at its prime during the calendar year of 1942, 1015 ships were sunk at a cost of only 87 U-boats. Until 1943, merchant shipping losses to U-boat action was exceeding gains from new construction.<sup>6</sup>

In 1943 the Allies implemented a series of techniques that overcame the U-boats' success. Using convoys, surface and air escort, new technology such as radar and sonar, and

incredible new construction rates, gains in merchant ships soon surpassed losses. By the end of 1943 U-boat losses were exceeding shipping losses.<sup>7</sup> The new offensive operational protection made it too costly for U-boats to operate.

FALKLANDS WAR: The Argentine Navy possessed four diesel submarines at the beginning of the Falklands Island conflict. Of the four, only one was truly seaworthy (capable of submerged operations), the *San Luis*. At the time of the conflict the British Navy was NATO's anti-submarine warfare (ASW) specialist and arguably the best in the world. Though no British vessel was successfully attacked by an Argentine submarine it was not due to lack of effort. The Argentineans claimed to have made three attacks with a total of six torpedoes all of which failed. Post conflict investigation by German and Dutch engineers revealed that all torpedoes failed due to tumbled gyros affecting their navigation systems. The British did not know they were up against only one submarine and expended almost all of their ASW weaponry on false contacts. In fact, so many weapons were expended that the United States was called upon to provide ASW weapons for the British depleted inventory. Despite the British Navy's best efforts, the ASW experts were unable to find only one SSK over a three month period. A one-submarine threat dictated, as much as did the air threat, the conduct of naval operations by requiring the British to continually dedicate valuable assets to protect against it. Operational protection from even a single submarine threat is difficult.<sup>8</sup>

### **THE SETTING**

THIRD WORLD SUBMARINES: Twenty-one Third World countries today operate a total of 110 submarines. This number has actually decreased over the last five years as

countries dispose of older models to make way for more modern and capable submarines.<sup>9</sup> In a world now dominated by free enterprise, if a nation has the resources, a SSK is available. The SSK is relatively cheap and offers superb 'bang for the buck' in firepower. Most are capable of both submerged mine and torpedo delivery. If littoral control of the seas is the objective, a SSK fits the bill and it possesses the major combat advantage of stealth. A SSK is highly maneuverable in constricted and shallow waters and its size provides for a very small sonar and magnetic target signature. When operating by electrical propulsion its radiated noise is virtually negligible making it difficult to locate acoustically.<sup>10</sup> But, the SSK does have its drawbacks. Size limits its battery storage of energy for electrical propulsion and to recharge these batteries it must snorkel making it vulnerable to detection or attack.

New technology provides the SSK an added edge. Air independent propulsion systems can increase submerged times from about four days to approximately three weeks. Older platforms are being improved by replacing existing combat systems with computer weapon systems available in the international market. Additionally, due to U.S. submarine success with Tomahawk cruise missiles, some Third World nations are now acquiring the ability to launch submerged anti-ship missiles such as Harpoon and Exocet (which, though air launched, proved deadly against British surface vessels in the Falklands War).<sup>11</sup>

All regions of the world now contain diesel-electric submarines. In the Far East China, North and South Korea, Japan, India, Pakistan and Indonesia all have SSKs. In the Middle East Iran, Turkey, Greece, Egypt, Israel, and Libya possess diesel-electric boats and Saudi Arabia and Malaysia have plans for their own force. Iran has now received its third Russian made Kilo submarine to aid in its quest to control the Strait of Hormuz. And in South America there are twenty-eight operational SSKs in seven different countries.<sup>12</sup>



As the Germans demonstrated in WWII, even with an inferior force they were able to inflict significant damage against two of the world's leading maritime forces at that time, the United States and Great Britain. The fire power of the U-boats dictated operational tempo in the European theater for several years and required 25 warships and 100 dedicated aircraft to defend against each U-boat.<sup>13</sup> More recently we have seen how a single SSK threat in the Falklands campaign required as much protection as did the air threat in that conflict. Third World countries that possess SSKs in future conflicts will not take on a superior force directly, but will attack critical vulnerabilities such as sea lines of communication (SLOC), allowing the quarry to come to them. The idea is to attack an enemy's critical weakness, in this case SLOCs, a form of cumulative attrition warfare which in the long run can weaken combat power.<sup>14</sup> A highly successful SSK campaign could cause an adversary to reach their point of culmination before achieving their objective thus making it too costly for the enemy to continue.<sup>15</sup>

ENVIRONMENT: Assuming future conflicts to be regional means that at some point forces must operate in the littoral environment. This is where the SSK excels. During the Desert Storm conflict, 95% of U.S. military supplies and equipment traveled by sea.<sup>16</sup> We can expect the same for future conflict but must not depend on having the excellent environment of the Gulf war. Saudi Arabia afforded new and modern deep port facilities that allowed for rapid and direct offload of logistics. Additionally, almost six months were available for buildup before subsequent hostilities. Most so called Third World nations do not possess this type of mature port facility.<sup>17</sup> Shallow water and restricted maneuvering room provide a small SSK force a distinct advantage over a large surface force which is limited in maneuverability in the littoral environment.

The SSK's vulnerability, having to snorkel to replenish battery power, is offset by the protective umbrella afforded by coastal defenses and shallow water when this operation is necessary. Additionally, the SSK will be operating in home waters where the crew will be most familiar with the underwater topography, geography and water environmental factors that enhance the SSK's stealth.<sup>18</sup> Crews will be familiar with shipping routes and know where to take position for advantage in an attack scenario; higher underwater noise levels due to dense shipping in the littoral environment make the quiet SSK even more difficult to locate. All of these environmental factors favor the SSK and make security from this threat difficult and costly in equipment, manpower and hours. Without firing a shot, the SSK in the littoral poses a threat that must be honored and protected against until it is removed.

**CRITICAL VULNERABILITIES:** All services depend on the operational success of sealift to which the SSK is an ominous threat. That a sealift vessel can travel unopposed for 2000 miles of a 2005 mile journey only to be sunk five miles short of its destination does no good. Sealift is a critical vulnerability that must be protected. With a 25% cut in naval combatants mandated, there is little enthusiasm for the purchase and maintenance of sealift ships.<sup>19</sup> In addition to sealift, both the Army's and Marine Corps' prepositioning maritime forces are at risk; if one of these ships are lost to an SSK's torpedo or mine, the equipment lost, not to mention the vessel, would take years to replace. U.S. Navy support ships such as oilers (TAO) and fast combat support (AOE), of which the U.S. currently has only 19, are another critical vulnerability.<sup>20</sup> These ships are continually on the move, replenishing an aircraft carrier for example approximately every three to four days. If one were lost to a SSK the ordnance delivery capability of an aircraft carrier and its battle group would quickly

diminish. By isolating attacks on logistical sustainment assets, the SSK can limit its adversary's freedom of movement and delay buildup of combat power.<sup>21</sup>

"Our sea and air lines of communication went unchallenged by enemy action." These words were used by General Hansford T. Johnson, USAF, commander, U.S. Transportation Command, in his report to the House Armed Service Committee concerning logistics support during Operation Desert Shield/Storm.<sup>22</sup> What would have happened if Iraq had two or more capable SSKs? Operational protection would have been mandatory. Both surface and air escort would have existed and significantly slowed a military buildup that unopposed took six months. Iraq would have controlled both time and space, allowing buildup of its own military and perhaps leading to attack into Saudi Arabia before coalition forces were prepared.<sup>23</sup>

To protect these vulnerabilities against a diesel-electric submarine threat requires dedicated forces--surface, air and subsurface--which in turn puts these assets also at risk. Any vessel, even an aircraft carrier, operating in the littoral with an unlocated SSK present is at risk. Though most surface vessels and certainly all nuclear powered attack submarines (SSNs) can outrun a SSK, the SSK has time, stealth and space on its side and in the congested littoral environment a target will cross its path sooner or later.

### **OPERATIONAL PROTECTION**

**PRINCIPLES OF WAR:** Operational protection, expressed as a principle of war, is simply security--protecting combat forces and their support. The purpose of security is to prevent the enemy from acquiring an advantage. Proper protection of forces preserves combat power and enhances freedom of action. To assure security the commander's staff

must conduct thorough planning which includes a meticulous understanding of the enemy's strategy for, and employment of, the SSK.<sup>24</sup> While security normally appears to be defensive in nature, it can be achieved in an offensive manner.<sup>25</sup> In the littoral, one of the missions of the SSK is to inflict damage and destroy an enemy's surface force--in other words to be offensive and attack. To counter this a commander may either take a defensive stance, taking actions only after being assaulted, or he may pursue an offensive approach by removing the threat before it inflicts any damage.

Before making this decision the operational commander will consider the three operational factors of space, time and force. He realizes that in the littoral a SSK already has two of these three factors working in its favor, that being space and force. In the littoral, space is limited. This small space acts as a disadvantage to a larger surface force, such as a carrier battle group. Limited space makes for limited maneuverability, concentrating the large force in a small area where it is vulnerable to attack and providing a small SSK force the ability to easily cover its larger adversary. Dispersal of forces (space) is one answer but is usually not possible in the more restricted littoral environment.<sup>26</sup> The only remaining factor is time. Of the three factors, time is considered the most important since space lost can be regained, but time lost can never be recovered.<sup>27</sup> Additionally, time and space have a reciprocal effect upon each other. An attacker's focus is to gain space in the least amount of time, while the defender, by retaining space, delays the attacker and costs him time. Every gain in time by the defender provides him the advantage, because the attacker must then increase his efforts which over time usually costs the attacker combat power.<sup>28</sup>

Knowing that time is both critical and the one factor the commander can control, a look at another principle of war, surprise is useful. Surprise is sometimes called the greatest

weapon of war. It is the creation of an unexpected situation for which the enemy is not prepared.<sup>29</sup> If an operational commander were to destroy the enemy's SSKs before they could get underway or pursue an offensive ASW plan, then surprise, security and control of time would be achieved. The United States' ASW approach has always been defensive in nature--absorb the first blow before taking action. An offensive approach would achieve surprise, as it is a change from our normal mode of operation. Destroying or neutralizing the threat through this approach thus provides security and helps gain control of time.

By employing an offensive course of action toward the SSKs, a domino effect ensues which allows the commander many options for follow on operations. By ensuring proper operational protection from the SSK, the commander provides for movement. Movement means mobility and allows for logistics flow vital to buildup and sustainment of mass.<sup>30</sup> Without sustainment one risks reaching the culminating point before obtaining the objective.<sup>31</sup> This buildup of mass then allows for superiority of force at the point of contact--not just superiority in numbers but superiority in fire power, weapons, skill and material where they are required most. This mass provides the opportunity to take the offensive, carrying the war to the enemy, and an important part of any offensive is the timed attack.<sup>32</sup> Time is the vital element that the commander must control and use to his advantage. The control of time starts with proper security.

By concentrating on one principle of war, security, and coordinating this principle with the operational factor of time, a sequence of events develops, each feeding upon the success of the others. The key to this plan is offensive vice defensive security.

**COMMAND AND CONTROL:** The success of any plan requires synchronization of forces and this rests with command and control.<sup>33</sup> Only through proper planning, direction,

coordination and unity of effort can the operational commander expect success in protection from the SSK threat. After proper intelligence is obtained, appropriate courses of action must be developed for potential scenarios. Unity of effort is a prerequisite to success in any mission.<sup>34</sup> With smaller force structure, ASW will need to be a joint effort and to accomplish this well organized command and control is essential. All assets--surface, subsurface and air--must act as a well coordinated joint team for success.<sup>35</sup> One reason the Germans were unsuccessful in the Battle of the Atlantic was a lack of unity of effort. While the *Kriegsmarine* was united in stopping Allied maritime trade, they had little support from the *Luftwaffe* and ultimately it was the unity of effort of the Allied forces that defeated the German Navy's efforts.<sup>36</sup>

### NEW VISION

...*From the Sea*, is clear about the Navy's future direction, "The shift in focus to littoral operations requires a corresponding shift of emphasis toward accelerating the adaptation of existing forces to counter littoral threats."<sup>37</sup> ASW has always been a unique naval mission and one that has concentrated on open ocean capabilities. Adapting to the littoral environment requires training. With smaller forces, ASW needs to join the joint arena; assets never before used in this capacity need to be exploited along with new techniques and equipment designed for prosecuting the SSK in the littoral.<sup>38</sup> Emphasis should be placed on training with joint assets in combined arms exercises the way we expect to fight, in the littoral environment where we expect to fight.<sup>39</sup> Only after thorough preparation will our forces be ready to offer the proper security.

Our new doctrine also speaks of battlespace dominance being, "...the heart of naval warfare."<sup>40</sup> Dominance requires an offensive mindset which is not new to the way the United States wages conflict, but it is a new idea for ASW. Gone are the days when U.S. forces can "slug it out" with an opponent. Smaller forces mean attrition warfare is no longer an option. Maneuver warfare is the way of future conflict.<sup>41</sup> It emphasizes the requirement to deal with specific situations, taking an indirect approach with regard to movement and time and, most importantly, it emphasizes taking action before the enemy can act.<sup>42</sup> Maneuver warfare is a new way of thinking for ASW, but one that is combat proven. In Desert Storm, coalition air forces struck first to insure airspace security and dominance before Iraq could react. These strikes were offensive in nature and a key to battlespace dominance.<sup>43</sup> Offense is also the key to future protection from the SSK threat. Without an offensive approach, a commander allows the SSK in the littoral to dictate courses of action, tempo, and momentum and thereby risks losing battlespace dominance.<sup>44</sup>

## **CONCLUSION**

The face of future warfare has changed. While the likelihood of a global nuclear war has diminished, regional conflict concerns have increased. In restructuring after the Cold War the U.S. military has slashed its forces, making every asset a valuable commodity and thus increasing the importance of operational protection. New naval and joint doctrine are the catalysts for change and provide the guidelines needed for a new direction in military strategies. The doctrine clearly supports an offensive approach to operational protection, but

in ASW it appears a defensive avenue continues to be pursued. The cornerstones for our future naval forces are:

- Command, Control and Surveillance
- Battlespace Dominance
- Power Projection
- Force Sustainment<sup>45</sup>

As the Navy prepares for these goals in future conflicts, high on the list to achieve them should be operational protection from the diesel submarine. Success or failure of this security will influence all future events. Fast, decisive combat with minimal losses is now the norm. Operational commanders need to take the “bull by the horns,” and move operational protection from the growing diesel submarine threat into the twenty-first century. They must develop and implement joint force offensive strategies to thwart the diesel-electric submarine threat before it can become a factor at sea. A defensive mindset of absorbing the first shot from this threat, as in past conflicts, is not the answer. Technology will provide some solutions, but the real answer lies in new offensive strategies to combat the threat. Offensive operational protection from the SSK threat is a key to future victory.

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## NOTES

<sup>1</sup> LT Christopher P. Carlson, "How Many SSNs Do We Need?," U.S. Naval Institute Proceedings, July 1993, 52.

<sup>2</sup> U.S. Department of the Navy, ...From the Sea: Preparing the Naval Service for the 21<sup>st</sup> Century, (Washington: 1992), 1,10; U.S. Department of the Navy, Forward...From the Sea, (Washington: 1994), 1,8.

<sup>3</sup> LCDR Michael Porier, "Sea Control and Regional Warfare," U.S. Naval Institute Proceedings, July 1993, 64.

<sup>4</sup> Terry Hughes and John Costello, The Battle of the Atlantic (New York: The Dial Press/James Wade, 1977), 35.

<sup>5</sup> Ibid., 35.

<sup>6</sup> Ibid., 304.

<sup>7</sup> Ibid., 304-308.

<sup>8</sup> CAPT Charles H. Wilbur, "Remember the San Luis!," U.S. Naval Institute Proceedings, March 1996, 86-88; ADM Harry D. Train II, "An Analysis of the Falkland/Malvinas Islands Campaign," Naval War College Review, Winter 1988, 40-41.

<sup>9</sup> CDR Kaj T. Madsen, "Fighting the Beast," U.S. Naval Institute Proceedings, August 1996, 28.

<sup>10</sup> Ibid.

<sup>11</sup> Office of Naval Intelligence, Worldwide Submarine Challenges, (Washington: 1996), 17, 19, 20; ADM Sandy Woodward, RN, and Patrick Robinson, One Hundred Days: The Memoirs of the Falklands Battle Group Commander (Annapolis: Naval Institute Press, 1992), 14-20.

<sup>12</sup> David Miller, "The Silent Menace: Diesel -Electric Submarines in 1993," International Defense Review, August 1993, 614-617; Office of Naval Intelligence, 28.

<sup>13</sup> U.S. Department of the Navy, Naval Doctrine Publication 1. Naval Warfare, (Washington: 1993), 32.

<sup>14</sup> U.S. Naval War College, Joint Military Operations Department, "Elements Of Operational Warfare," NWC 4096, August 1996, 3, 4.

<sup>15</sup> Ibid., 21, 25.

<sup>16</sup> Richard T. Ackley, "Sealift and National Security," U.S. Naval Institute Proceedings, July 1992, 41.

<sup>17</sup> Ibid., 43.

<sup>18</sup> Antony Preston, "Stealthy Submarines and ASW," Military Technology, September 1992, 69-70.

<sup>19</sup> Ackley, 45.

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<sup>20</sup> LCDR Stan DeGeus and LTCOL R.J. Martin, "U.S. Armed Forces...Basic Training," U.S. Naval War College, Joint Military Operations Department, September 1996, 13.

<sup>21</sup> U.S. Naval War College, Joint Military Operations Department, "Operational Functions," NWC 4103, August 1996, 28.

<sup>22</sup> Desmond Wettern, "The Threat That Never Was," Sea Power, November 1991, 31.

<sup>23</sup> Ibid.

<sup>24</sup> Joint Publication 3-0, "Doctrine for Joint Operations," February 1995, A-2.

<sup>25</sup> RADM C.R. Brown, "The Principles of War," U.S. Naval Institute Proceedings, June 1949, 630.

<sup>26</sup> U.S. Naval War College, Joint Military Operations Department, "Elements of Operational Warfare," 11.

<sup>27</sup> PROF Milan Vego, "Operational Factors," NWC 4092, U.S. Naval War College, September 1996, 23.

<sup>28</sup> Ibid., 26.

<sup>29</sup> Brown, 629.

<sup>30</sup> Ibid., 626, 629.

<sup>31</sup> U.S. Naval War College, Joint Military Operations Department, "Elements Of Operational Warfare," 21.

<sup>32</sup> Brown, 626.

<sup>33</sup> U.S. Naval War College, Joint Military Operations Department, "Operational Functions," NWC 4103, August 1996, 2.

<sup>34</sup> Ibid., 2-4.

<sup>35</sup> CAPT Bruce R. Linder, "The Future of Joint ASW," U.S. Naval Institute Proceedings, September 1995, 69-70.

<sup>36</sup> U.S. Naval War College, Joint Military Operations Department, "Operational Functions," 2-6.

<sup>37</sup> U.S. Department of the Navy, ...From the Sea: Preparing the Naval Service for the 21<sup>st</sup> Century, 7.

<sup>38</sup> Linder, "The Future of Joint ASW," 70.

<sup>39</sup> LCDR Jim Shannon, "Undersea Warfare Is TEAM Warfare," U.S. Naval Institute Proceedings, June 1996, 49.

<sup>40</sup> U.S. Department of the Navy, ...From the Sea: Preparing the Naval Service for the 21<sup>st</sup> Century, 8.

<sup>41</sup> U.S. Department of the Navy, Naval Doctrine Publication 1. Naval Warfare, 33.

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<sup>42</sup> Ibid.

<sup>43</sup> U.S. Department of the Navy, ...From the Sea: Preparing the Naval Service for the 21<sup>st</sup> Century, 8.

<sup>44</sup> U.S. Department of the Navy, Naval Doctrine Publication 1. Naval Warfare, 63.

<sup>45</sup> U.S. Department of the Navy, ...From the Sea: Preparing the Naval Service for the 21<sup>st</sup> Century, 7.

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